

REMARKS

The Examiner appears to rely in part on public use of the SuperCache V.1.2 Product. In this regard the Examiner cites to MPEP Section 2133.03 (a) (2). The MPEP states that if an inventor puts an invention in public view even if hidden, within a computer for example, the invention is in public use. Prior to the critical date of May 6, 1993, which is one year prior to the original filing date, the SuperCache V.1.2 Product was only available for use on stand alone computers. The invention, on the other hand, relates to caching on a network. Stand alone customers had no access to the network based caching product. The SuperCache V.1.2 Product for use on a network was undergoing testing and thus was not available to the public and was not in public use. Thus, the SuperCache V.1.2 Product for use on a network is not prior art.

Factual Background for the SuperCache V.1.2 for Networks

The inventor, Ian Percival, developed the present invention for assignee, EEC Systems. Support for this factual statement is provided in the enclosed Declaration of Eric Dickman and where indicated by earlier prepared Declarations submitted with the Information Disclosure Statement filed with the present application. The invention made it possible for the EEC SuperCache program to be used on networks of computers. There were only three locations outside of EEC authorized to use the SuperCache program on a network of computers prior to the critical date of May 6, 1993 (one year prior to the May 6, 1994 priority date). These locations were used by EEC to test the invention in different computer cluster environments before making it available to the public. The clusters owned by EEC were not sufficient in and of themselves to fully test the SuperCache program to know if it would work in other environments. Indeed, after tests in-house, there were numerous bugs in the program that were uncovered by testing at outside facilities. In order to test the SuperCache program for networks, EEC, allowed temporary installations of the program at EDS Personnel Communications ("EDS"), Digital Equipment Corporation (Boxborough, MA) ("DEC"), and Nemonix, Inc. (Hopkinton, MA). (Declaration of Eric Dickman dated Nov. 5, 2004, hereinafter "2004 Declaration", par. 4) A foreign company, Nexcom Limited in the U.K., also received the test tape but was told not to install the

software because of problems uncovered in the early testing at EDS. (2004 Declaration, par. 6)

The various test sites provided different computer environments for testing of the SuperCache software. Internally, in early 1993, EEC had two test clusters. One consisted of two MicroVAX III computers and two Alpha computers (AXP 150 & AXP 3500). The second cluster consisted of a VAX 6240, two MicroVAX III computers, and an Alpha 4000 computer (model 200, with 2 CPUs). Besides offering different computer hardware configurations and yet-to-be released hardware such as the VAX 7000 and the Alpha 7000, the external test sites also had yet-to-be released operating systems. Open VMS 6.0 for VAXs and Open VMS 1.5 for Alphas were in field test by DEC and were not available to the public until DEC released the new operating systems in June of 1993.

EDS had a cluster of multiple VAX 6000 series computers, and also another cluster of two uni-processor VAX4500 computers. EDS ran field test versions of VMS version 6.0 on its VAX 6000 series cluster after hours, as well as VMS 5.5-2 for VAX on that cluster. On the other cluster it was running newly developed field test V6.0 for VAX as well as VMS VAX V5.5-x. Testing was performed on both versions of the operating system.

DEC had a cluster field testing the new VAX 7000 and the new Alpha 7000 computers. The cluster was also field testing the newly developed operating systems (VMS 6.0 for VAX & VMS 1.5 for Alpha.). (2004 Declaration, par. 7)

Nemonix had a cluster of VAX 8600 computers, and an Alpha 3500 in a VMS cluster for testing the newly developed field test versions of VMS 6.0 for VAX computers, and VMS 1.5 for Alpha computers.

The inventor, Ian Percival, who worked for EEC Systems maintained strict control over these test installations by providing each installation with a temporary network license key. The network license key was further limited in that it was specific to a configuration of computers. It could not be moved for use on other computers because it was linked to the Ethernet addresses of the network. The program could not function on a network without the license key. The license key was required to let a user unlock the program for use on a network.

The old SuperCache V1.0 and V1.1 sought to cache computers in a network but did not work successfully in a network. In SuperCache V1.0 and V1.1, if a device was being cached on any node in the network, then invalidate messages would be sent to all nodes in the network. It was not until the inventor had completed SuperCache V1.2 for testing within EEC Systems that there was a caching program in which each disk had an invalidate list providing those nodes that permitted caching of that disk. Invalidates would only be sent to the remote nodes identified by the list.

Testing of SuperCache V1.2 began at EEC Systems November 5, 1992. Testing continued within EEC Systems in November, December and January. More rigorous testing was required in view of the demands that can be placed on the SuperCache program. Thus, in January 1993, the program was provided to EDS for more rigorous testing on its clusters of computers. Throughout January, February and March problems were identified and corrected. In March, a major problem was fixed that was causing data corruption. After this fix, the program was made available to DEC and Nemonix for additional field testing.

The primary test location outside of the EEC Systems facility was EDS in Waltham, MA. This was only a couple of towns over from EEC Systems in Sudbury, MA. In January 1993, EEC first brought over the SuperCache program to begin testing on the EDS cluster. EEC made frequent visits to the EDS facility to monitor the testing being performed on the EDS clusters licensed to operate the SuperCache software. As testing continued, SuperCache was repeatedly revised in an attempt to get it working satisfactorily. On February 8, 1993, a new revision, SuperCache V1.2-08 was shipped to EDS after the earlier version failed. Because the testing proceeded so actively under EEC's supervision, it eventually installed at EDS a perpetual license for use during the testing. EDS did not have access to the SuperCache source code. The testing proceeded after hours with the cooperation of EDS' principal consulting engineer, Chris Yetman. Whenever the system, including the SuperCache program crashed, or an error occurred, EDS did a system dump of all system memory onto tape. EEC personnel would pick up the tapes and bring them back to EEC for analysis to determine the cause of the error. These crash dumps resulted in a number of program fixes reported in the SuperCache release notes as set forth in the Declaration of Eric Dickman dated January 30, 1996 at paragraphs 18-22.

A major problem was fixed by changing cluster transition code in the SuperCache program. This resulted in SuperCache V1.2-10 issued on March 22, 1993. Additional sites were sought for further testing on different cluster configurations. Field test kits were provided to DEC and Nemonix. DEC was the manufacturer of the Alpha computers and the seller of the Open VMS AXP V1.5 Operating System for which SuperCache was intended to work. The Alpha 7000 computer and its operating system were also merely in field tests at this time. The Open VMS Alpha V1.5 Operating System was not publicly released until June of 1993. DEC had these machines under field test and was able to test the SuperCache software in conjunction with the Alpha 7000 computer in the test cluster. The temporary license for use of the SuperCache program allowed a specific cluster within DEC's development lab to conduct tests on the SuperCache program. The license could not be transferred to any other computers outside of the secure DEC facility because it was linked to the Ethernet addresses of the cluster. Nemonix also had a cluster with a field test version of the Alpha VMS V1.5 Operating System, and VMS VAX V6.0 field test operating system. Upon testing the SuperCache program, a bug was identified at Nemonix and reported to EEC Systems. That bug was fixed in the April 1, 1993, SuperCache V 1.2-11 version of the software. Nemonix was a distributor of hardware and software who was anxious to sell the SuperCache software for networks. EEC, however, did not permit any sales until at earliest May 6, 1993.

A distributor in Holland wanted to sell the SuperCache program to a customer. An overnight package was sent out May 6 to Holland. On May 7, 1993, a license key for use on a stand alone computer was provided to the customer in Holland. Thereafter, on May 10, 1993, the foreign customer upgraded to a perpetual license key for SuperCache on a cluster. This resulted in the first revenue booked by EEC Systems for SuperCache for use in clusters. The SuperCache for clusters product was officially announced in the June 21, 1993 issue of Digital News & Review. (Declaration of Eric Dickman dated Jan. 30, 1996, Ex. D)

In July 1993, EDS paid for yearly maintenance of earlier software products from EEC. At this time, EDS was given an upgrade to SuperCache so that its clusters could make actual commercial use of the SuperCache program in clusters.

Even in May 1993, inventor, Ian Percival still had reservations about SuperCache for clusters. Another software vendor, Micro Technology Inc. ("MTI") of Anaheim, California, showed an interest in the SuperCache software. It was learned that MTI had a diagnostic program called Cache Diag that could further subject SuperCache to rigorous testing. MTI sent EEC Systems the Cache Diag program for use in continuing testing of SuperCache. Sure enough, an obscure race condition in the SuperCache for clusters program was identified and eventually fixed to produce SuperCache V1.3-00. On September 3, 1993, SuperCache V1.3-00 was released. The inventor, Ian Percival, was finally confident in the operation of the SuperCache program on clusters.

MPEP 2133.03(e)

Applicant refers the Examiner to the MPEP 2133.03 (e), "If the use or sale was experimental, there is no bar under 35 U.S.C. § 102(b)." The first factor considered by the MPEP is commercial exploitation. As set forth above, EEC Systems did not receive revenues from the SuperCache for clusters program until completion of the foreign sale of May 10, 1993. EDS, DEC and Nemonix were field testing the SuperCache software on clusters. EDS eventually received the SuperCache program for commercial use when it paid its invoice for maintenance of earlier received software in July 1993. DEC let its temporary license expire without following up with a purchase of the product for use on clusters. But DEC did announce the availability of the SuperCache program for accelerating data access on clusters including its new Alpha computers in the June 21, 1993 Digital News and Review. Nemonix followed up by selling SuperCache software for clusters after the testing period completed. A sale was made to the Naval Undersea Warfare Center in Newport, RI on May 13, 1993.

MPEP 2133.03(e)(2) looks at whether the inventor had an intent to experiment. There is much objective evidence of experimental intent. The retrieval of crash dumps from EDS and the repairs in response to the errors found show the inventor's intent to experiment. By holding the SuperCache for clusters program back from sale while testing proceeded, EEC demonstrated its subjective view that the software was still being tested. The

identification of an error by Nemonix and the repair of the error confirms that the program was still in testing.

MPEP 2133.03(e)(3) looks at completeness of the invention. In early May 1993, Mr. Yetman of EDS informed EEC that he felt SuperCache was working properly in the tests on the clusters at EDS. On May 6, 1993, EEC permitted a program tape to be sent to Holland. On May 10, 1993, a foreign sale of the product for clusters was allowed to be made to a foreign customer. However, inventor, Ian Percival still had reservations. Sure enough, further testing with Cache Diag revealed an obscure race condition in the SuperCache for clusters program was identified and eventually fixed to produce SuperCache V1.3, which was released on September 3, 1993. Percival was thereafter comfortable with the sale of the product to cluster customers.

Numerous factors leading up to the critical date support the Applicant's view that the SuperCache program for networks was in testing prior to May 6, 1993. EDS, DEC and Nemonix were engaged in experimental uses of the SuperCache program. It is well known that bugs in software may be only revealed under certain circumstances on certain machines. It was necessary to test the SuperCache program on a variety of different clusters and subject it to a variety of different conditions. The inventors maintained strict control over the SuperCache program. These programs were licensed temporarily for the experiments being conducted at EDS, DEC and Nemonix. The source code was maintained confidential and not made available to the testers. Thus, the methods of the invention such as the targeting of invalidation messages to only those nodes caching a specific shared I/O device were kept secret from persons other than EEC personnel. The testing of the software at EDS took place from January, 1993 to early May 1993. Nemonix and DEC did not receive their field test kits until after March 22, 1993. The field test period was reasonably short for software. The field testing of the Digital Equipment Corp. VAX 6.0 operating system and the Alpha VMS V1.5 operating system, for example, was from November 1992 through June 1993. No payments were made for the SuperCache program for use on clusters in the time period prior to the critical date. When SuperCache programs were delivered to the field test sites, as was the custom, they were accompanied by a user guide and a license agreement. The license agreement reflected EEC's interest in maintaining restricted access.

(See Declaration of Eric Dickman July 16, 1997, par.4-6 and Ex. A) During the testing, there was no commercial exploitation of SuperCache for use on clusters. During testing and particularly at EDS, the inventor worked with EDS to study any crash dumps. EDS was a current customer of EEC Systems older caching products. EDS was also cooperative in allowing EEC Systems to benefit from the after hours testing of the SuperCache for clusters product under various test environments. DEC was the maker of the computer operating systems for which the SuperCache product needed to be compatible. Nemonix was a potential distributor of the SuperCache program. Nemonix sought the ability to sell the SuperCache for clusters product, but had to await sufficient testing of the software at the test locations

MPEP 2133.03(e)(5) examines the inventor's supervision and control. During the testing of the SuperCache program, the inventor and the Assignee, maintained strict control over the program at the test sites. The program itself was only available for use for a limited time through the license key. Only EDS eventually received a longer life license key, for the convenience of the testing given the frequent contact between EEC and the EDS during the test activity. Once a license key expired, the program could not be used without getting a license key. Moreover, the license key was specific to the clusters at the test site designated for the experimentation.

Pursuant to MPEP 2133.03 (e) (6) the testing conducted on the SuperCache program was clearly developmental and technical. As a result of the testing, various bugs in the program were corrected. Applicant submits that the overwhelming weight of the relevant factors establishes that SuperCache V1.2 was not in public use on clusters prior to May 6, 1993.

Federal Circuit Precedent

The Federal Circuit Court of Appeals recognizes that experimental use does not constitute public use under Section 102 (b). The case of *Manville Sales Corp. v. Paramount Systems, Inc.*, 917 F. 2d, 544-16 U.S. P.Q. 2d 1587 (Fed. Cir. 1990) is instructive. Manville installed its iris arm luminaire assembly on a test pole at its research and development center in Ohio. After the design proved operable on the test pole, Manville installed the luminaire at the Fort Steele rest area along a highway in Wyoming. The court ruled that the use of the

luminaire assembly in the public rest area was experimental and not a public use under 102 (b). In order to determine whether the invention was in public use, the court considered the totality of the circumstances relative to the policies underlying the public use bar.

First, the Federal Circuit found that Manville did nothing to lead the public to believe that its invention was in the public domain. Likewise, the inventor and EEC Systems did not mislead the public. EDS, DEC and Nemonix were merely conducting trials on specific clusters of computers. DEC and Nemonix were running the SuperCache V1.2 program on field test Alpha VMS V1.5 computers. The operating system was not yet available to the public. The testers were requested to provide EEC with information so that any bugs in the program could be addressed. Indeed, EDS ran rigorous tests after hours and provided crash dumps to EEC Systems. The testers were not entitled to a permanent license nor had they paid for the opportunity to test the program. The programs were used at EDS after hours. All of the testing facilities at EDS, DEC and Nemonix, were in private facilities that had reception areas to restrict entry into the building "making it unlikely that the public would even see the new design." *Manville Sales Corp.*, 917 F. 2d at 550.

Second, the court found that Manville did not attempt to extend its patent term by commercially exploiting its invention more than one year before it filed a patent application. Likewise, SuperCache V1.2 for use on network of computers was not available for license until at earliest May 6, 1993 and the first perpetual cluster license key was not issued until May 10, 1993. Indeed, EEC specifically prevented sale of the program for use on a network during the testing period prior to May 6, 1993.

Finally, the court held that Manville's actions were entirely consistent with the policy "favoring prompt and widespread disclosure of inventions." The court went on to say "Prior to its testing in the winter environment, there really was no basis for confidence by the inventor that the invention would perform as intended and hence no proven invention to disclose." *Manville*, 917 F.2d at 550. Likewise, EEC Systems had no basis for confidence in the SuperCache program before testing it in the various cluster environments with a variety of stresses and differing software environments. Manville also tested its invention in Ohio. The court said further testing to determine the invention's ability to serve its purpose would not subject the invention to section 102 (b) bar." *Manville*, 917 F.2d at 551.

The Federal Circuit was also persuaded that the patentee was not making an after the fact attempt to characterize its actions as experimental. Likewise, here, the collection of crash dumps, the limitation on the licenses, the lack of payment for use of the program and the bug fixes made to the program demonstrate with contemporaneous evidence that the inventor always considered these actions to be experimental. Based on these findings, the court felt that there was no public use. The patent examiner should hold similarly with respect to the SuperCache program for clusters.

The EEC Ups Ante Article

The reference "EEC ups ante in VMS disk caching arena with three-tiered package for VAX clusters" (Digital Review, March 16, 1992) is not at all relevant to the discussion of whether the SuperCache V1.2 was publicly used. First of all, the announcement of a caching product for VAX clusters was premature. Secondly, this announcement was made in advance of SuperCache V1.0. SuperCache V1.0 was never successfully used on a network of computers. It was only used on stand alone computers. A number of the patent claims in the present application relate to sending invalidate messages only to those nodes that are caching the same disk to which data was written. A list of such nodes for each disk is kept. At the time of the "EEC ups ante" announcement, EEC only had a SuperCache product in which the network product would attempt to send invalidates to all nodes for any device that was being cached on any node in the cluster. It was not until SuperCache V 1.2 was first released for internal testing on November 5, 1992 that EEC Systems had a product that used the concept of sending invalidates only to those nodes that were permitted to cache the disk that received the write instruction.

Circumstances relating to the early announcement of a caching product were explained in the declarations of Eric Dickman and Pamela Cleveland submitted to the USPTO for the first time on April 1, 1998. EEC Systems thought based on trials on its simple Ethernet cluster of two microVAX 3200 single processor computers that they had a caching product for clusters that they could sell. After the announcement, the program that they had available for caching clusters was delivered on a trial basis to a few potential customers. In every case, the caching product caused a crash. EEC Systems worked at fixing the problems in its program, but was unable to get it working for its potential

customers. Therefore, it was not possible to sell the SuperCache for clusters product. Anyone interested in obtaining a caching product for clusters from EEC would be informed that the SuperCache product was not ready for sale. EEC continued its attempts to develop a saleable product. In the fall of 1992, Digital Equipment Corporation ("DEC") announced its Alpha 64-bit architecture computers. A new caching product had to be written to accommodate the new Alpha computers. The new product was tested as described above in detail. Applicant submits that the announcement in the Digital Review (March 16, 1992) related to an early product that was not itself ready for sale. It does not contradict the discussions of experimental use of the later SuperCache V1.2 software product.

Claims Rejections – 35 USC §103

Claims 1-110 appear to be rejected under 35 U.S.C. §103(a) as being unpatentable over the I/O Express Software Product (as taught by the I/O User's Guide and the I/O Express Technical Report) in view of SuperCache V.1.2 User and Installation Guide: A Turboware Product. ("SuperCache User Guide"). Applicant submits that the SuperCache User Guide does not qualify as a printed publication and therefore does not constitute prior art. However, Applicant concedes that SuperCache was sold and used on stand alone computers and provided those stand alone computers with caches of different bucket sizes.

SuperCache User Guide is Not a Printed Publication

Applicant traverses the examiner's use of the SuperCache User Guide as prior art. The issue to be resolved is whether the SuperCache User Guide constitutes a printed publication under 102(b). Applicant informs the examiner that in a previous review of this issue Examiner Bragdon gave his view that the SuperCache User Guide was a printed publication. (See U.S. Serial 08/657,777 now US Patent No. 5,918,244, Office Action dated June 23, 1998). Applicant respectfully submits that Examiner Bragdon's interpretation of the Federal Circuit decision in the case of *Northern Telecom, Inc. v. Datapoint Corp.*, 15 U.S.P.Q. 2d 1321 (Fed. Cir. 1990) was mistaken. A correct understanding of this case leads to the inevitable conclusion that as a matter of law the SuperCache User Guide was not a printed publication under 102(b).

“A document, to serve as a printed publication, must be generally available.”
Northern Telecom, Inc., 15 U.S.P.Q. 2d at 1325. As set forth in Mr. Dickman’s declaration dated July 16, 1997, the SuperCache User Guide was available to only about two dozen customers prior to the critical date of May 6, 1993. As set forth in Mr. Dickman’s declaration, “At all times prior to May 6, 1993, the SuperCache User and Installation Guide was distributed by EEC only in conjunction with shipments of its SuperCache software.” The SuperCache User Guide, therefore, was not generally available to the public and does not constitute a printed publication under §102(b).

A similar question was presented to the Court in the *Northern Telecom* case. That case involved a determination as to whether four reports identified as Exhibits DX-2 through DX-5 constituted printed publications. These reports were distributed to approximately 50 persons or organizations involved in the AESOP-B military system project. Thus, in *Northern Telecom*, about twice as many copies of the documents at issue were distributed as compared with the SuperCache User Guide. One of the exhibits in the *Northern Telecom* case included a legend indicating “Reproduction or further dissemination is not authorized... not for public release.” However, the other documents while being of the type that would include such a notice could not be shown to have contained the notice. Whereas Exhibits DX-2 through DX-4 only might have included a restrictive notice, the SuperCache User and Installation Guide was delivered to the two dozen customers with a blank license agreement that contained in paragraph 5 restrictions against dissemination of the SuperCache User Guide. Applicant therefore submits that having distributed fewer copies and including a restrictive notice along with the copies, there is less reason to consider the SuperCache User Guide a printed publication than there was for Exhibits DX-2 through DX-5 in the *Northern Telecom* case. In view of the court’s holding that Exhibits DX-2 through DX-5 were not printed publications as a matter of law, the SuperCache User Guide is even more appropriately considered not to be a printed publication under § 102(b).

Examiner Bragdon was of the mistaken belief that the *Northern Telecom* decision was based on physical control exercised over the reports purporting to be printed publications. He thought the reports were housed in a library at Mitre Corporation and that the fifty recipients merely had access to the reports. The statements of fact in the Federal Circuit

decision were written in a somewhat ambiguous manner contributing to Examiner Bragdon's misconception. Referring to the district court decision from which the appeal had been taken, we find a clear statement of the facts. "They [the reports] were distributed to at least 50 commercial and private individuals and companies involved in the project.... The documents were also contained in a library at the Mitre Corporation, the company developing AESOP-B, and were not classified." *Northern Telecom, Inc. v. Datapoint Corp.*, 9 USPQ2d 1577, 1601 (N.D.Tex. 1988) The Federal Circuit held that distribution to 50 recipients under these circumstances and placement in the Mitre library did not give the public access to the documents by the exercise of reasonable diligence. The SuperCache User Guide was even less accessible to the public and hence not a printed publication according to Federal Circuit precedent.

The appropriate section of the MPEP to consider is § 2128. The MPEP, consistent with the holding in *Northern Telecom*, defines a printed publication as one that is accessible to the public. The SuperCache User Guide was not generally available to the public. It was only distributed to about two dozen recipients of the SuperCache product for use on stand alone computers prior to the critical date. It was accompanied by a license agreement document that urged restrictions on dissemination. (See Declaration of Eric Dickman dated July 16, 1997) Because the SuperCache User Guide is not a printed publication, it cannot be relied upon to reject claims of the present application. Applicant will therefore address the rejection based upon I/O Express in view of the SuperCache product for standalone computers.

Amendments

The amendments to claims 6, 12 and 32 are meant to better clarify what was meant in the originally filed claims. Claims 25 and 28 have been amended so as to distinguish over SuperCache standalone product. Claims 31, 37, 49 and 59 have been amended to overcome the rejection. Claims 88 and 90 have been written in independent form. Claims 91, 95, 102 and 105 have been amended to overcome the rejection. Claims 63-86 have been canceled to more quickly move this application to issuance. Applicant reserves the right to pursue the claims in a different continuation application.

Caching with Multiple Bucket Sizes on a Network

Claims 9, 14, 21, 25, 28, 45, 47, 88, 90, amended claim 91, 101 and 110 recite caches with different bucket sizes on a network in which multiple computers or servers can cache data for the same I/O device. Although the invention is claimed with different scope in each of the claims, the distinction over the prior art bears similar reasoning. Applicant submits it would not have been obvious to take different bucket sizes per cache as taught in standalone systems and to make use of them in a caching system for a network of computers.

A cache uses the RAM memory of a computer. If a computer runs out of available memory, it will hang or crash. It can not function without sufficient free memory. Providing a plurality of caches of different bucket sizes adds to the amount of memory sucked up by the caching software. In a stand alone computer, excess demands by the caches for memory can be met by returning memory holding old cached data to the operating system. The task of returning memory takes time, but typically in a stand alone computer sufficient time is available to attend to this task. On a network, less time is available to accommodate a lack of memory situation. Reaching across the network, particularly a busy network, to read data from an I/O device can be quite time consuming. Upon returning the read data to the requesting computer, a cache that interrupts the return of data so that it can be stored in one of a plurality of caches adds to the time delay. If additional time is required to make memory available, because the designated cache lacks free memory and the operating system has run out of available memory, the system may very likely hang or crash. The read and storage of data in one of the multiple sized caches is not able to be completed in time to prevent the hang in a memory starved situation. Thus, networks with shared access to I/O devices impose constraints on caching not found in stand alone computers.

The network cache system of I/O Express does not teach or suggest imposing the burden of caches of different bucket sizes on the network. Likewise, the stand alone implementations of SuperCache do not teach how to overcome the problem of implementing caches of different bucket sizes on a network. With the problem of avoiding crashes and hangs undisclosed, Applicant respectfully submits that it would not have been obvious to combine the caches of different bucket sizes found in a SuperCache stand alone computer with the cache on a network disclosed by I/O Express.

While Applicant attempted to implement caches of different bucket sizes on a network in 1992, his efforts did not meet with success. It was not until Applicant had conceived a system memory check 32 as shown in the application, that caches of different bucket sizes was able to have a chance of being reliable in a network. The system memory check is meant to substantially avoid the situation where the operating system runs out of available free memory and hangs or crashes. Applicant therefore submits that his invention as set forth in claims 1, 9, 14, 21, 25, 28, 45, 47, 88, 90, 91, 101 and 110 and all claims depending therefrom was non-obvious in view of the lack of a working solution in I/O Express and the stand alone SuperCache product.

Targeted Invalidation Messages

Claims 6, 8, 12, 15, 22, 31, 37, 43, 49, 53, 59, 95, 102 and 105 all relate to Applicants' invention of using targeted invalidation messages to maintain cache coherency on a network with I/O devices that can be shared. Although the invention is claimed with differing scope in each of the claims, the distinction over I/O Express bears similar reasoning. The I/O Express Product was an entirely different architecture from that of the claimed invention. In accordance with I/O Express Technical Report Sept. 30, 1992, page 2, "I/O Express marks the modified data blocks in the caches on all the nodes of the cluster as invalid, then sends the new data to the disk." (emphasis added) Invalidates are sent to all the nodes in the cluster without regard to whether the node caches data for the pertinent I/O device. There is no suggestion by I/O Express of targeting invalidation messages. To the contrary, I/O Express suggests broadcasting over the network messages to all the computers. Referring again to I/O Express Technical Report Sept. 30, 1992, this time at page 4, the summary repeats, "I/O Express notifies all other nodes on the cluster that the data block has been changed, and they mark the data as invalid."

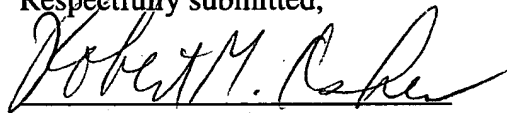
The SuperCache product for standalone computers does not satisfy the deficiencies of the I/O Express Product. Since the SuperCache product was not for public use in computer clusters, the standalone product provides no teaching with respect to maintaining cache coherency and thus does not teach the sending of invalidation messages to remote computers. Given that I/O Express teaches the broadcasting of invalidation messages, the

use of targeted invalidation messages by Applicant justifies allowance of claims 6, 8, 12, 15, 22, 31, 37, 43, 49, 53, 59, 95, 102, 105 and all claims depending therefrom.

Claims 8, 34, 40, 43, 49, 53, 59, 95, 102 and 105 recite "determining a list" so that invalidation messages can be targeted in accordance with the claimed invention. As I/O Express does not teach the targeting of invalidation messages to selected nodes, it has no reason and makes no suggestion to develop such a list for the purpose of targeting invalidation messages. For this additional reason, these claims should be allowed.

For all the foregoing reasons, Applicant submits that all claims pending in the application are allowable over the art of record. Early notice to that effect is respectfully solicited.

Respectfully submitted,



Robert M. Asher
Reg. No. 30,445
Bromberg & Sunstein LLP
125 Summer Street, 11th Floor
Boston, MA 02110-1618
(617) 443-9292
Attorney for Applicant